

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Jerry Chow	§	Art Unit:	2432
		§		
Serial No.:	10/813,003	§	Confirmation No.:	5213
		§		
Filed:	March 31, 2004	§	Examiner:	Jung W. Kim
		§		
For:	Memory Protection	§	Atty. Dkt. No.:	NRT.0199US
	Systems and Methods for	§		(15923ROUS04U)
	Writable Memory	§		

**Mail Stop Appeal Brief-Patents**

Commissioner for Patents

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**REPLY BRIEF**

Sir:

The following sets forth Appellant's Reply to the Examiner's Answer dated 02/05/2010.

In the Examiner's Answer dated February 5, 2010, the Examiner raised a new ground of rejection against claims 26-28. Previously, claims 26-28 were rejected as purportedly obvious over Bryant in view of Bishop. The rejection of claims 26-28 over Bryant and Bishop has been withdrawn in the Examiner's Answer. In the new ground of rejection, claims 26-28 are rejected as purportedly obvious over Hind in view of Bryant and Bishop.

Appellant respectfully requests that the appeal be maintained.

**VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

- A. Claims 1, 9, 10, 22-25, 30, 32, 34, 35, 41 and 46 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Bryant, US 5,628,023 in view of Bishop Computer Security, Chapter 29.5 "Common Security-Related Programming Problems"**
- B. Claims 1, 2, 4, 7-9, 11-15 and 46 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Beukema US Patent Application Publication No. 2002/0124148 in view of Bishop**
- C. Claims 16, 17, 19, 20, 22, 25-28, 36, 39, 43-45 and 47 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hind, US 6,976,163 in view of Bryant and Bishop**
- D. Claims 1 and 3-6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over England, US 7,194,092 in view of Bishop**

**A. REPLY TO EXAMINER'S ANSWER REGARDING THE § 103 REJECTION OF CLAIMS 22-25, 30, 32, 34, 35 OVER BRYANT AND BISHOP**

As conceded by the Examiner, Bryant fails to disclose rendering the memory protection key in the memory write command inaccessible by overwriting at least a portion of the memory protection key upon completion of the memory write command, as recited in claim 22. Examiner's Answer at 5. Instead, the Examiner cited Bishop as purportedly disclosing the claimed feature missing from Bryant. *Id.*

It is respectfully submitted that a person of ordinary skill in the art would not have been prompted to combine the teachings of Bryant and Bishop. As taught by Bryant, a user program stores a token in a register location. Bryant 19:41-42. Subsequently, when the user program issues an instruction to modify the information currently stored in a previously protected page, the user program issues a special instruction that retrieves the token from the register and provides the token to the hardware. *Id.* 19:43-50. The token that is provided by the user program (retrieved from the register) is compared to a token assigned to a protected page frame, and if the tokens match, the hardware permits the user program to update the protected memory location. *Id.* 19:59-67.

Significantly, as specifically taught by Bryant, the user program stores the token in the register **for future use**, i.e., for subsequent retrieval when using one of the special instructions. *Id.*, 17:35-37. As further taught by Bryant, "other programs can be authorized to store to the protected page if they are provided with the location of the register storing the token." *Id.* 17:37-40. Thus, Bryant actually would have led a person of ordinary skill in the art **away** from the claimed invention, which recites that the memory protection key in the memory write command that has been written to the volatile memory is rendered **inaccessible** by overwriting at least a portion of the memory protection key in the volatile memory upon completion of the memory

write command to make the memory protection key in the volatile memory **inaccessible after completion of the memory write command.**

The Response to Arguments section of the Examiner's Answer quoted a passage in column 5, line 55 – column 6, line 20, of Bryant. *Id.* at 24. This cited passage of Bryant actually supports Appellant's arguments raised in the Appeal Brief. As explained in this passage of Bryant, a token is stored in a register such that the program can access the token when the program needs to alter the contents of the protected page. Bryant, 5:59-61. In operation, a user program issues a special instruction that **retrieves the previously stored** token from its register. *Id.*, 6:1-2. Thus, the cited passage of Bryant makes it clear that the token that is stored in register is kept in the register **for future use**, such that a user program would be able to retrieve a previously stored token from the register.

As purported support for the rejection, the Examiner made the following characterization of Appellant's arguments:

Appellant's rationale stems from the notion that sensitive information should be rendered inaccessible only when sensitive information is no longer useful. However, the teaching expressed in Bishop is more nuanced than the one suggested by Appellant. In the computer arts, the usefulness of particular information depends on a specific instance of the information; i.e. a data value stored in a particular context. Hence, data representing sensitive information located in a specific volatile memory location is no longer useful when the specific memory location no longer requires use of the data. In view of this distinction, Appellant's argument that the token should not be erased because it is stored for future use pertains only to the data values stored in the register and the PVST/PVPT tables. In contrast, the data value representing the retrieved token, which is part of the special memory command and which is temporarily stored in volatile memory, is only used during the comparison step to validate the memory write command. Once the verification step is performed, the data value stored in this volatile memory is not used again and should be securely erased.

Examiner's Answer at 26. It is respectfully submitted that the Examiner has mischaracterized Appellant's arguments. Appellant's arguments were focused on the specific teaching in Bishop that the register of Bishop stores a token for **future use** by a user program, which is contrary to

the subject matter of claim 1 relating to rendering the memory protection key that has been written to the volatile memory inaccessible by overwriting at least a portion of the memory protection key in the volatile memory upon completion of the memory write command to make the memory protection key in the volatile memory inaccessible after completion of the memory write command.

The Examiner also pointed to some “temporary memory” that the Examiner argued is inherently in hardware to allow the performance of the token validation step discussed in column 6 of Bryant. Examiner’s Answer at 25. The Examiner appears to suggest that a key protection step would be performed by Bryant with respect to this “temporary memory” that is in hardware, while the same token that is present in the register can be kept unprotected and is made available for future use by a user program. This interpretation of Bryant clearly is not supported by the objective evidence of record.

Since Bryant specifically and **expressly** teaches that a token is kept in register for future use by a user program, a person of ordinary skill in the art would clearly not have been led to providing an extra protection step with respect to a “temporary memory” that purportedly exists in hardware (where the protection step is to render a memory protection key in such “temporary memory” inaccessible after completion of the memory write command by overwriting at least a portion of the memory protection key in such “temporary memory”). Such an extra protection step would be completely unnecessary and would make no sense whatsoever since the register itself has a token that is available to a user program.

Stated differently, rather than rely on the express teachings of Bryant (which clearly would have led a person of ordinary skill in the art away from the claimed subject matter), the Examiner instead attempts to rely on some “inherent” teaching of Bryant which does not exist

and would clearly be inconsistent with the express teachings of Bryant that clearly specify that the token in the register is available for access by a user program.

For the foregoing reasons and the reasons stated above and for the reasons stated in the Appeal Brief, it is clear that the obviousness rejection of the foregoing claims is erroneous.

**B. REPLY TO EXAMINER'S ANSWER REGARDING THE § 103 REJECTION OF CLAIMS 1, 2, 4, 7-9, 11-15, 46 OVER BEUKEMA IN VIEW OF BISHOP**

In response to Appellant's arguments presented in the Appeal Brief, the Examiner argued that the key values submitted in work requests of Beukema "are sensitive because only a user with the proper key value can access protected memory." Examiner's Answer at 27. The Examiner then concluded, using clearly impermissible hindsight reconstruction, that a person of ordinary skill in the art would have been prompted to incorporate the teachings of Bishop into Beukema to render the protection key of Beukema inaccessible by overriding the key. *Id.*

It is clear that a person of ordinary skill in the art, looking to the teachings of Beukema, would not have been prompted to provide a key protection mechanism that involves overwriting at least a portion of a memory protection key written to all volatile storage such that the memory protection key written to the volatile memory is inaccessible after completion of the memory command. If protection of the keys in Beukema were of such concern, then why did Beukema not disclose some protection mechanism to overwrite a portion of the keys written to storage in Beukema? The fact that there is no such teaching in Beukema provides clear indication that a person of ordinary skill in the art would not have been prompted to incorporate the teachings of Bishop into Beukema to achieve the claimed subject matter.

For the foregoing reasons and the reasons set forth in the Appeal Brief, it is clear that the foregoing claims are non-obvious over Beukema and Bishop.

**C. REPLY TO EXAMINER'S ANSWER REGARDING THE § 103 REJECTION OF CLAIMS 1, 3-6 OVER ENGLAND AND BISHOP**

The Response to Arguments section of the Examiner's Answer concluded that a storage key value submitted in a request in England is sensitive, and therefore, a person of ordinary skill in the art would have been prompted to incorporate the teachings of Bishop into England to achieve the claimed invention. Examiner's Answer at 29. Again, the Examiner has used impermissible hindsight. It is clear that England provides no hint whatsoever of any desirability to apply any type of protection mechanism to its storage key values. The Examiner's proposed modification of England with the teachings of Bishop is clearly based on impermissible hindsight that has benefited from the disclosure of the present invention.

For the foregoing reasons and the reasons set forth in the Appeal Brief, it is clear that the obviousness rejection of the foregoing claims over England and Bishop is also erroneous.

**D. REPLY TO THE NEW GROUND OF REJECTION OF CLAIMS 26-28 OVER HIND, BRYANT, AND BISHOP**

Claims 26-28 depend from claim 44, which in turn depends from claim 25, which depends from claim 22. As argued in the Appeal Brief, the obviousness rejection of claim 22 over Hind, Bryant, and Bishop is clearly erroneous.

In view of the allowability of base claim 22 over Hind, Bryant, and Bishop, it is clear that dependent claims 26-28 are allowable over Hind, Bryant, and Bishop.

**E. CONCLUSION**

In view of the foregoing, and in view of the arguments presented in the Appeal Brief, reversal of all final rejections is respectfully requested.

Respectfully submitted,

Date: April 5, 2010

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